

Effect of Fat and Protein Contents on Droplet Size and Surface Protein Coverage in Dairy Emulsions

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Oil in water emulsions were prepared using anhydrous milk fat and skim milk homogenized with a laboratory-scale microfluidizer. The fat content was varied between that of raw milk and cream, 4 to 30 g/100 g. Protein content was also varied between 3.2 and .4 g/100 g; emulsions had a fat to protein mass ratio between 1 and 13. Droplet size distribution and protein surface coverage were measured and expressed in terms of fat to protein mass ratios. Aggregation appeared with increasing fat to protein mass ratio, whereas the average droplet diameter remained unchanged. Surface area in emulsions increased with fat content because of a larger number of droplets rather than a change in droplet size. The fraction of adsorbed protein increased with fat to protein mass ratios; the maximum fraction of adsorbed protein was 85%; therefore, part of the protein present did not adsorb. Protein surface coverage was ca. 10 mg/m² at fat to protein mass ratios <4 and slightly decreased for higher fat to protein mass ratios.

Key Words: dairy emulsions • droplet size • protein coverage

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